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SOME INFLUENCES OF THE SEA UPON THE INDUSTRIES OF NEW ENGLAND

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Although all the thirteen colonies had access to the sea, in none of them was the influence of tidewater so potent as in the New England settlements. Since the Middle and Southern colonies were better endowed with agricultural wealth than New England, tillage of the soil was their foremost activity. New England alone, poor in farm produce, turned from the niggardly soil to the generous ocean, where fishing and commerce became the sources of her greatness and gave rise to almost all of her other activities.

SHIPBUILDING AND SUBSIDIARY INDUSTRIES

Within a year of the founding of Boston the first ship, the *Blessing of the Bay*, was upon the stocks, and from that time until the Civil War shipbuilding was one of the most familiar occupations in New England. The white pine that covered the region was especially adapted to sea service because it was buoyant, staunch, and cheap. English oak was heavier, and Baltic fir was more expensive; there was no wood that could compete with New England pine. In 1791 the cheapest construction in France cost \$55 to \$60 a ton, whereas in New England ships could be built for \$33 to \$35 a ton. With the sea at their doors and with fishermen or merchants calling constantly for more craft it is no wonder that shipyards flourished. In 1760 American yards were turning out yearly from three to four hundred commercial boats, and a host of less important ones such as dories, sharpies, and small sail boats. Before the Revolution, out of a total population of approximately 3,000,000 there were no less than 4,000 men engaged in shipbuilding.

The sea not only developed New England commerce and promoted shipbuilding, but in addition it stimulated several subsidiary industries. Among these was the manufacture of rope and cordage. The first ropewalk was set up at Boston in 1641, but soon thereafter every port of any consequence had its own ropemakers. A modern survival of these colonial rope factories may be seen in the great plant at Plymouth, Mass.; this mill within sight of the famous "Landing Rock" is now the greatest works of its kind in the country. Another industry corollary to commerce was food packing. Flour mills, biscuit factories, and salt meat packers were established at the great ports such as Boston, Salem, Providence, New Bedford, New London, and New Haven. The first milk cracker made in America was a product of the Boss Biscuit Company, located almost upon

the docks at New London, Conn. The present-day great pork-packing plants at Somerville, Mass., are descendants of the little establishments that once fitted out deep-sea sailing ships. Along the waterfront of every port, too, there were numerous tailor shops to make the clothing needed by sailors. The ready-made clothing factories of Boston can trace their ancestry to these primitive businesses.

IRON MANUFACTURES

The sea, then, was responsible for New England's prominence in ship-building and the allied supply industries, such as ropemaking, food packing, and tailoring. It was the greatest influence as well in promoting the growth of New England iron manufacture because it constituted in its commerce the largest consuming market. We are not accustomed to associate iron manufacture with New England; nevertheless Massachusetts was the leader in iron production from 1650 to 1750. In all the other colonies iron manufacture was a strictly local business using local raw materials and supplying a small local market; but on account of her maritime market New England's iron business was of a more commanding character. The biggest item in iron making was the shaping of nails from bar iron to aid in shipbuilding and the construction of dwellings in the thriving ports. Inasmuch as nails were handmade and the demand was large, it was obligatory for nearly every household to devote its spare time of evenings to hammering out these essential articles. Indeed nails often replaced money in bartering goods at rural stores. It is significant that in 1790 in Massachusetts, where the demand was greatest, the first nail-slitting machine was invented. A survival of the former art is found today at Taunton, Mass., a town now without iron resources, yet the American leader in the manufacture of tacks.

Besides nails there was a large market for iron in Massachusetts for anchors, bells, cannon, and cannon balls—all vital parts of a ship's equipment. The boat's cargo was usually confined in casks or barrels and these were held together by iron hoops; indeed in 1795 one-half the iron output was devoted to the manufacture of hoops. Iron kettles for refining the sugar or molasses brought in by ships, and iron pans for providing the salt that preserved the food for outgoing boats, both created a demand for furnaces and forges. So, all told, the sea provided great inducements for New England iron manufacturers.

WOOD MANUFACTURES

Ocean commerce also gave rise to the cooperage industry. The fish, rum, flour, and other provisions that were carried out of the colonies were packed in casks or barrels; the imports, sugar and molasses, arrived in the same kind of containers, and even staves and barrels themselves became articles of commerce. Cooperage consequently was a promising shore industry created by the deep-sea traffic. New England's resources in wood

gave her such an advantage in barrel-making over European rivals that it was claimed that cheap barrels were as good as an extra 15 per cent profit to American merchants.

In response to the demands for wood along the shore the lumber industry of New England was promoted. At first lumbering was entirely incidental; that is, it was a necessary preliminary to clearing a space for farming. But after shipbuilding commenced, lumbering, although it was largely confined to the winter season, became a regular part of a farmer's activities. The lumber was not only employed for ships and used in constructing the towns that commerce favored, but also was a not unimportant article of commerce, especially with the timber-denuded, plantation-covered West Indies. Where wood as such was not shipped it often passed into commerce in the form of potash, for which there was a constant demand. The burning of wood to potash or pearlash was especially convenient for farmers in new clearings, for the timber that was otherwise a valueless nuisance could be converted without much labor into a revenue producer.

DISTILLING AND THE REFINING OF RAW MATERIALS

Thus the influence of the sea was felt from the iron furnaces and shipyards along the water's edge to the remote inland clearings. Its potency is equally apparent in the industries that sprang into existence upon the ocean's border in order to refine the raw materials brought into New England by returning cargo carriers. Two commodities, sugar and molasses, were the chief return freight from the West Indies. In response to abundant raw materials and a market greater than the production, sugar refining and the distillation of rum from molasses flourished all along the New England shore. Rum at that time was an especially valuable product, in demand by farmers and sailors alike. It was as customary an article of a ship's stores as the sailor's biscuit or salt pork; in outfitting a vessel for a voyage it was usual to allow as much (\$92 to \$275 a trip) for rum as for bread. Inasmuch as the more southern colonies, notably Pennsylvania, turned surplus grain crops into beer and had no raw materials for rum, the distilled spirit was an important article of domestic as well as foreign trade. Massachusetts Bay and Narragansett Bay were famous for their distilleries.

Less repugnant to modern ideals was another distilling industry created by sea trade; namely, the manufacture of fish oil, whose principal source of material was the whale fisheries. Since New Bedford, New London, and Stonington were the chief home ports for the whaling fleets these towns became the leading whale-oil centers. The fishing and commercial ships required large amounts of salt for packing the catch or preserving provisions. This salt was refined from sea water, and the process was a well-known occupation from Long Island to Marblehead. Another item often listed in the cargo of home-coming boats was the cacao bean, the raw

material for the refining of chocolate and its by-product cocoa. The first chocolate factory was erected near Boston, and it is interesting to note that a chocolate plant still operates upon the same site.

Among other imports, New England received considerable gold and silver in payment for fish, rum, and lumber. The precious metal carried into Providence, R. I., gave birth to the jewelry industry in that place; and later, when an ingenious Yankee there made use of the art of plating, the foundation was laid for the fame of Providence in the jewelry industry. Today the nation's greatest center for the manufacture of cheap jewelry is the town of Attleboro, Mass., just beyond the boundaries of Providence, and the latter city is still the principal selling agent for plated metal ware.

Rubber manufacture is likewise largely confined to New England because her ships brought crude rubber to her shores along with other curious products from out-of-the-way places. Boston, Providence, and New Haven each received goodly shipments of raw rubber. Very little use was made of it, however, until Goodyear and Hayward discovered that an admixture with sulphur prevented rubber from softening under heat and becoming sticky. Sulphur also gave rubber new properties and greatly extended its application to industry. The new plants for the manufacture of overshoes, fountain-pen barrels, hose, gloves, webbing, and dozens of other rubber products rose near Boston, Providence, and New Haven and may be most often seen in those districts even at the present day.

COTTON MANUFACTURE

These industries—rubber, jewelry, chocolate, and refining—however, have never been New England's greatest manufacturing assets. Since 1800 first place must be given to textiles and shoe manufacture. Here, too, the sea with its traffic has had an important bearing upon New England's success in these branches of manufacturing.

As everyone knows, the inventions that placed textile making upon a machine factory basis were made in England and not in the United States. Although we had made crude attempts to spin yarn by machines at Beverly and Bridgewater, Mass., and at Providence, R. I., and some attempts also at Philadelphia and at Stateburg, S. C., none were successful until the arrival of Samuel Slater, an English immigrant, especially trained in the art of machine spinning. Slater first went to Philadelphia, but, receiving no encouragement there, he tried employment in New York. In that city a captain of a Providence sailing packet told him that Brown and Almy, merchants of Providence, were experimenting with cotton manufacture and wanted a man who understood machine spinning. From this chance Slater went to Providence and under Brown and Almy set up in 1790 the first successful cotton-spinning factory in America. Within twelve years men trained in this mill established twenty-nine other cotton factories in

nearby Connecticut and Massachusetts, thus making Providence the chief seat of cotton manufacture in America. The raw materials for these early mills were ocean-borne. The cotton did not come from our own Southern colonies, for England bought our entire crop; but our early New England mills were exclusively sustained by the commerce carriers plying between New England ports and Dutch Guiana and Santo Domingo.

Beginning in 1814, when power weaving was first applied in a complete factory at Waltham, Mass., the cotton industry passed into a second phase in which it retreated inland from the port towns to water-power sites. The principal influence of the sea in this era was the supplying of capital. Merchants engaged in commerce were the only persons in America who had free capital to experiment in the new manufacturing ventures. The most famous cotton mills, such as those of Lowell and Lawrence in Massachusetts, and Biddeford, Lewiston, and Saco in Maine, were all established by merchants whose fortunes had been derived from overseas trade.

About 1840 cotton manufacture entered a third phase, wherein the sea again became more dominant. At this time steam-driven mills began to appear, first at Newburyport, Mass., and then at Salem. Coastal mills using steam engines had an advantage over inland factories because coal could be brought to their doors cheaply by water. As steam engines were improved the steam-driven mills steadily encroached upon the business of the inland water-power factories, and after the Civil War the coastal mills wrested the crown of supremacy from the Merrimac Valley. Lowell, long champion, had to bow before Fall River, the new leader. New Bedford, neighbor to Fall River, has now outstripped her in quantity production, just as she has long claimed the primacy in quality. Cheap transportation of fuel has been of great advantage to these tidewater mills. They also benefit by cheap carriage of raw cotton; for, although the material now seldom arrives by water, potential competition of the sea keeps down railroad rates. Furthermore, the maritime climate benefits the coastal mills. Since the rubbing that cotton gets in manufacturing creates frictional electricity, the yarn twists and snarls in dry air, but a moist atmosphere helps to disseminate the current; hence a high humidity is favorable to cotton manufacture. The coastal mills gain this humidity at all times by their proximity to the sea, and the frequency of fogs adds to the benefits of the location. Humidity is even more necessary to American mills than English because our machinery is belt-driven, whereas the English is geared. As everyone who has been in an American factory knows, moving belts create a large amount of electricity.

Our cotton industry, then, was sent to New England by a sea captain, its mills were first supplied by New England's regular commercial carriers, its later mills were equipped by commercial capital, its modern plants are advantageously situated in respect to fuel and raw materials, and, finally, the coastal factories benefit by a maritime climate.

SHOE MANUFACTURE

Not only the cotton industry, but the shoe industry as well, has been able to attain first place in New England because the sea was close at hand. Although shoemaking was a local industry in all the American colonies, it attained distinction in Massachusetts. Everywhere else the village cobblers were hampered by a lack of raw material and confined to a local market by the difficulties of transportation. Only at Lynn, Mass., were these obstacles removed. Lynn lay between Salem and Boston, two of the principal colonial ports. The boats that carried fish and other products away from these harbors brought back cargoes of hides collected from scores of places touched on the voyages. Some vessels made special trips to the west coast of South America and California with the sole purpose of gathering hides for the New England tanneries. Lynn as a result never suffered from a scarcity of raw materials. Likewise the coastal trading boats putting out from New England carried shoes to the other Atlantic colonies and states. Shoes made from California hides often took a second voyage around South America to be sold to the Mexicans of Santa Barbara, California. Lynn took precedence of all other Massachusetts coastal towns in shoemaking because by accident the subdivision of labor in shoe manufacture was first applied there. This device enabled most of the sewing upon shoes to be passed out to women in their homes. The women most eager to secure extra income were those in sailors' families, because the breadwinners were often away for months or years upon extended voyages. Lynn owed its shoe industry to the ocean transport of raw materials or completed shoes, and to the labor force built indirectly by overseas commerce.

Thus from New England's earliest industries, fishing, commerce, and shipbuilding, down to the present leadership in cotton and shoe manufacture, the sea has been a potent influence. Several of the minor manufactures, such as rubber products, jewelry, or refining, originated in New England because the ocean enabled the raw materials to be collected at a favorable situation.